

centage of fat as copra and rather more than palm kernels and it is considered that in the market, the oil should fetch about the same price as coconut oil and palm oil.

There are certain difficulties in dealing successfully with it, the chief of which are (1) the exceptionally hard nut which necessitates special crushing apparatus and (2) that experiments with mechanical crushing show that the kernels bruise very easily and during transit to any distance the oil in them becomes rancid. The latter is under further investigation and it is probable that the difficulties will be overcome successfully in the near future.

Possibilities. The possibility of the palm ever being of any economic value in this country seems improbable, owing to the length of time needed before the plant becomes sufficiently mature to produce fruits. When once this stage has been reached the yield seems fairly regular and no doubt on a large area sufficient fruits could be obtained to make it a paying concern. Until it can be made to produce fruits at an earlier age it is of no value in Malaya. It seems to be a subject for further investigation and if data could be obtained from British Honduras dealing with yield and age, the question could quickly be settled as to whether it would be worth while experimenting with a view to shortening the period needed for fructification or not worth while.

The note dealing with the use of *Attalea* nuts in the coagulation of rubber, points to two possibilities:—(1) the extraction of oil from the kernels and (2) the use of the hard shell for coagulating rubber, provided *Attalea Cohune* and *Hevea brasiliensis* could profitably be grown in close proximity. The latter point is open to criticism in that a certain amount of oil of an inferior quality can be extracted from the shells and with the mechanical problems solved no doubt this would be extracted and placed on the market. Which of these two procedures would be most profitable it is not possible to state and can only be determined by actual experiment. It may be mentioned in passing that as *Attalea Cohune* grows in low lying land, there would appear to be a use for the low-lying swampy portions of land often found on estates and which are put to no practical use. This however, all depends upon the question of shortening the period between the sowing of the seed and the fruiting stage, so far as Malaya is concerned.

F. FLIPPANCE.

THE BRAZIL-NUT TREE IN SINGAPORE.

In 1911 Mr. W. J. Young, discussed the Brazil nut in the Pomona College Journal of Economic Botany, 1, pp. 122-134, and came to conclusions which are questionable. It is convenient to introduce the subject in his own opening sentences. "The genus, *Bertholletia*, to which is assigned the Brazil-nut of commerce, was

established in 1808 by Humboldt and Bonpland, who placed in it a single species, *B. excelsa*. A translation of Bonpland's description of the fruit of this species follows.

Fruit a spherical compound nut of the size of a child's head and often larger, divided internally into four cells each of which encloses several nuts: covered on its exterior with a husk of green colour, smooth and shining.

Main nut very solid, rough and marked by the branching furrows on its outer surface, 6 lines (1 cm.) thick, divided internally into four cells by as many membranous dissepiments which become obliterated in part or entirely after the maturity of the fruit but of which there always remain traces.

The tree is described as 33 m. high (110 ft.) with a trunk 9 dm. (3 ft) in diameter. Leaves alternate, oblong, subcoriaceous, 1 dm. (4 in.) broad and 6 dm. (23½ in.) long, borne on short petioles. Type locality, Rio Orinoco.

On account of the great height of the trees these botanists were unable to obtain the blossoms although it is said that they offered in vain an ounce of gold for specimens. On this account they were uncertain as to the position which the genus *Bertholletia* should occupy in the vegetable kingdom."

In 1855, Berg, monographing the Brazilian Myrtaceae within which order the genus *Bertholletia* falls, gave a new description, which Miers (Trans. Linn. Society, London, Vol. XXX, 1873, pp. 161) was quick to see diverged from Bonpland's and Humboldt's. Thereon, he made two species, *B. excelsa*, Humb. and Bonpl. and *B. nobilis*, Miers, the latter being *B. excelsa*, Berg.

He followed the first authors and ascribed the origin of the Brazil-nut of commerce to *B. excelsa* rather than to *B. nobilis*.

But in 1911 Mr. W. J. Young (in the Botanical Gazette, lii. pp. 226-231, and in the Pomona College Journal of Economic Botany, pp. 122-127—I have only seen the latter), from an examination of consignments, at the United States ports, of fruits, declared Miers wrong and that *B. nobilis* is the origin of the Brazil-nut of commerce; he states:—

"Commercial samples of Brazil-nuts contain in larger or smaller numbers, opercula derived from the fruit and the presence of these in itself is evidence that the nuts were derived from *B. nobilis*, since as had been noted (earlier in his paper), the opercula fall from the mature pyxidial of *B. excelsa* and hence would not find their way into the sample of nuts from that source. On the other hand their presence in the nuts from *B. nobilis* is perfectly normal and what would be expected since in this species the opercula fall into the interior of the pyxidial and become mixed with the nuts. They vary in form from ovoidal bodies to cones of varying slope and all provided with a distinct apical point.

Every pyxidium of the Brazil-nut the writer has examined, has indicated that the fruit is that of *B. nobilis*. Their main

points of structure are well shown in the figures.....which illustrate pyxidia obtained from different sources. Comparisons of the photographs with Miers description of *B. nobilis* will leave no doubt of their identity. Most, if not all, of the pyxidia which the writer has examined were brought to this country by the importers of Brazil-nuts and represent the source of the nuts in which they deal."

In 1914, Dr. T. Petch, in the *Annals of the Royal Botanic Gardens, Peradeniya*, V, pp. 421-431, as a result of study of a living tree controverted Young's statements, concluding thus:—

"It is evident that the Peradeniya tree in many respects combines the characters of the two species. The foliage is that of *excelsa*, and the shape of the pyxidium is that of *excelsa*, though the opercular openings are those of *B. nobilis*."

On the whole, though conclusions based on a single tree can scarcely be regarded as valid, it would appear that this Peradeniya tree affords strong ground for the suggestion that there is, after all only one species of *Bertholletia*."

It is proposed here to give the results of an examination of the trees in the Economic Garden, Singapore, chiefly of the two older trees.

The Ceylon plant was introduced from Kew, in 1880: in 1881, Singapore received plants also from Kew: a common origin of the older trees is, therefore, possible. Observations on the two older Singapore trees are below. The third and younger tree would have a different origin.

In the Singapore trees the characters assigned as identification marks to Miers' two species are mixed and the proportion of characters said to belong to *B. nobilis* are to those said to belong to *B. excelsa* as 8:5.

From the examination of the fruits only, upon which Mr. Young has relied, our trees will fall into the species, *B. nobilis* and not into the species *B. excelsa*: but from other marks the conclusion holds that there is only one species.

SUMMARY OF THE CHARACTERS.

1. Height: diameter ratio:: 36.4:1; 41.3:1;
42.5:1. excelsa.
2. Trunk bare up to about (1) 25 feet; (2)
30 feet; the third tree 10 feet .. nobilis.
3. Leaves dark green when old, young *rufescent* nobilis and
excelsa.
4. Petiole is up to 28 mm. long .. excelsa.
5. Panicles 10.5 inches long, with 3-6 side
branches horizontal and then becoming
parallel nobilis.
6. Floral nodes 0.5 inch. apart nobilis.

- | | | | | | |
|-----|---|----|----|----|----------------------------|
| 7. | (a) Pyxidium globose | .. | .. | .. | nobilis. |
| | (b) Pyxidium elongated | .. | .. | .. | excelsa. |
| | (diameter of the fruit according to the size of the fruit) | | | | |
| 8. | Cortex of the fruit rough, thick and much lenticellated | .. | .. | .. | nobilis. |
| 9. | Opercular opening small, widening considerably inwards; or with nearly straight walls narrowing slightly at the inner end | .. | | | Mixed excelsa and nobilis. |
| 10. | (a) Operculum conical with a sharp point: | | | | |
| | (b) Operculum cylindrical flattened at the top | | | | Mixed excelsa and nobilis. |
| 11. | Calyx tridentate | .. | .. | .. | excelsa. |
| 12. | Cortex of the fruit cracks but does not peel off if the fruit is handled | .. | .. | .. | Mixed excelsa and nobilis. |
| 13. | Operculum falls into the cavity of the fruit | | | | nobilis. |
| 14. | Cavity of the fruit unicellular on withering of the septa | .. | .. | .. | nobilis. |

G. B. DESHMUKH.

THE CORRECT BOTANIC NAMES FOR THE WHITE AND THE YELLOW GUINEA YAMS.

In the Gardens' Bulletin (this volume No. 3, 1918, pp. 81-91) short notes were given upon the above named two West African Dioscoreas, being important foods of many millions of Negroes. In it the identity of the second with *Dioscorea cayenensis* was stated; but no latin name was used for the first; and the purpose of returning to the subject here is to suggest that it is *D. rotundata*, Poiret (Encyclopédie méthodique, supplement, vol. III, 1813, p. 139). *D. rotundata* was described upon a specimen from the New World: but that Poiret could arrive at describing an African plant as West Indian is very easily understood.

The White Guinea Yam is grown in West Africa from Sierra Leone to Angola in great quantities. It is in the ground for eight months of the year, at the end of which period the dug tubers are stored in racks in the villages for consumption as long as they can be got to rest.

Having a wide area and great importance, it is raised in a considerable number of races, nineteen of which, grown in Nigeria, are figured here from photographs taken by Mr. J. Hutchinson of the Royal Botanic Gardens, Kew. Some of these races are earlier than others, and used for prolonging the season; some are more palatable; some heavier yielders, etc.: but of their qualities at present indications only are available.